AUSTRALIAN ACADEMY OF SCIENCE

NEWSLETTER

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2007 Fenner Conference on the Environment

Photo: © Irene Dowdy

Frank Fenner, Graeme Pearman and Kurt Lambeck

Sustainable stewardship of water supplies for Australian communities was the focus of the 2007 Fenner Conference on the Environment: *Water, population and Australia's urban future*, organised by the Academy. The conference examined the critical and increasingly shaky relationship between water and population distribution.

The keynote speaker, Dr Graeme Pearman FAA, highlighted the need for flexibility in planning to maintain resilience in the water supply system. He said: 'To me, part of acting sustainably is keeping that resilience open.'

Professor Graeme Hugo noted that the Australian population is growing at 1.3 per cent, which is faster than the Asia-Pacific region, and three times as fast as the average for OECD countries. He estimated Australia's population to be around 25 million in the 2020s. 'Any arguments for 50 million or for 8 million are really not sustainable in any way' he said.

Professor Hugo also pointed out the mismatch between where the people are located and where the water is present: 'In the far north we have 2 per cent of the population and 52 per cent of the run-off.' He also suggested that the vast bulk of the water in the south-eastern part of the continent was committed in one way or another.

Although Australians are quite mobile – about 18 per cent of the population move house every year – we don't seem to shift our population distribution in a major way. The major changes are in the movement to south-eastern Queensland and to south-western Western Australia. Professor Hugo suggested: 'Reductions in run-off will have some impacts on population distribution.'

Professor John Langford said: 'If the autumn/winter of 2007 is dry, Australia will be in a critical position…for the first time in our history all the irrigation storages are at critically low levels…If short term political influence results in over-allocation of water, it is like printing money in a time of inflation: all they are doing is degrading the security of all the other irrigators' entitlements.'

In many regions of Australia experiencing the 'sea change' phenomenon – where people move to the coast – water is becoming the limiting factor for further development and immigration. This point was highlighted in a lively discussion of local government responsibilities by panellists Councillor Dick Gross, Mr Jon Black, Mayor Paddi Creevey, Councillor Robert Bell and Mr David Butt.

Panel Chair Councillor Gross commented that Australians 'are urban and suburban creatures. Whilst our mythology is a rural mythology, our reality is that we do reside primarily in urban areas, and increasingly in coastal urban areas.'

As the challenge of managing water resources increases, the need to match the organisational scale of tiered governance systems with the spatial scales at which most significant environmental externalities occur is being recognised.

The term 'institutional clumsiness' was used to describe the difficulties experienced by local government in trying to implement water sensitive designs. Councillor Gross said: 'Local government is a very diverse beast. In Tasmania and Queensland local governments distribute water, in Victoria [they] used to but now do not…this is one of the difficulties for local government in trying to have big national conversations, because their responsibilities are so different.'

Panellists also discussed the skills shortage. Although the emphasis is often on capacity, Mayor Creevey observed: 'One of the things we are very concerned about is the lack of people who are trained in the sciences to implement a lot of these initiatives.'

The Academy's President Professor Kurt Lambeck concluded by saying: 'The drought and flood cycles are very much part of the Australian scene, but with the superimposition of long-term climate trends, the period between extreme cycles will probably shorten. There is the potential that politicians and policy makers will only pay attention to these issues once the two cycles – the political cycle and the climate and drought cycle – begin to have similar time constants.'

Proceedings of the conference are available at:
www.science.org.au/events/fenner2007/index.htm

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A new home for the Birch collection

The Academy is delighted to announce that the family of the late Professor Arthur Birch (PresAA 1982–1986) has presented his collection of nearly 100 historical scientific books to the Basser Library on permanent loan.

The majority were published in the 1800s or the early 1900s, with the earliest book, Francis Bacon's *Sylva Sylvarum* dating from 1639. The collection is held in a locked blackwood bookcase commissioned by Mrs Birch. The books may be used within the library by bona fide researchers, but will not be available for borrowing.

The family has also presented to the library the remainder of Professor Birch's collection of scientific books. This includes some more modern books relating to the history of science. These books will be held on open shelving close to the historical collection.

Some of the historical books, with Professor Birch's comments are as follows:

Berthollet CL. **Researches into the laws of chemical affinity** (1804)
This is a fascinating and important book, still showing the confusion between reactivity and affinity (valency), but making considerable advances, for example in the direction of the Law of Mass Action.

Dalton JA. **New system of chemical philosophy** (1808)
This is of course, the most important book ever published on fundamentals of chemistry. Bought: Oxford about 1939, seven pounds (then two weeks' income for me).

Priestley J. **Experiments and observations on different kinds of air** (1774)
A very important experimental text concerned with gases, especially a clear primary definition of the nature of oxygen, and of carbon dioxide, ammonia and hydrogen. Acquired, surprisingly, Canberra 1984, price $35 (but the bookseller regarded it merely as some old book).

For more information contact Rosanne Walker on 02 6201 9431 or **rosanne.walker@science.org.au**

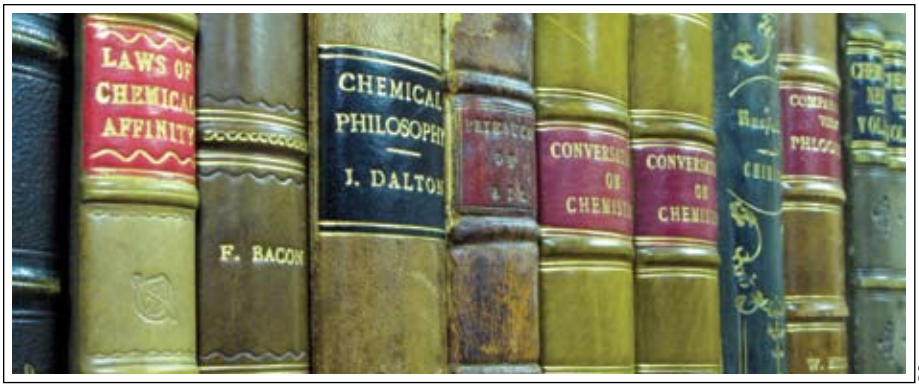


Photo: © Jacinta Legg

Historical books of the Birch collection

Forthcoming events

16–17 July: Elizabeth and Frederick White Research Conference – The Magellanic System, CSIRO Australia National Telescope Facility, Epping, Sydney.
www.atnf.csiro.au/research/LVmeeting/mag_program.html

29 July–2 August: Boden Research Conference – Disulfide bonds and their role in protein folding and function (Australian Society for Biochemistry and Molecular Biology), Heron Island, Queensland.
www.imb.uq.edu.au/index.html?page=55595&pid=31137

30 October: Sixth annual High Flyers Think Tank 2007 – Extreme natural events, University of Melbourne.

2–5 December: Fenner Conference – Wildlife population dynamics and management, The Shine Dome, Canberra.

Important dates in 2007

8–10 August: 4th Australia-China Symposium, Beijing

8 September: Orientation Day for Korean Postdoctoral Fellows, Canberra

24–26 September: InterAcademy Panel Executive meeting, Canberra

4 October: Australian Foundation for Science AGM, Canberra

New topics on *Nova*

Probing past and future materials with neutrons, sponsored by the ARC Molecular and Materials Structure Network.
www.science.org.au/nova

Annual report

The Academy's annual report is now available online at:
www.science.org.au/reports/2007anrep.pdf
For printed copies please email **eb@science.org.au**

Science shines at the Dome

The Academy held the annual *Science at the Shine Dome* event from 2–4 May. Academy Fellows and the President Professor Kurt Lambeck were joined by newly elected Fellows, Academy award winners, early-career researchers and award-winning science teachers. The address at the open session of the meeting by Kurt Lambeck is available at: **www.science.org.au/events/agm2007address.htm**

The Academy's President, Council members, new Fellows and Chairs of Academy committees enjoyed a reception hosted by Their Excellencies the Governor-General Major General Michael Jeffery and Mrs Marlena Jeffery at Government House in Yarralumla. The social highlight for all Fellows and guests was the annual black tie dinner in Parliament House, Canberra, where the Governor-General was the dinner speaker. The transcript of the address is available at: **www.gg.gov.au/governorgeneral/speech.php?id=22**

Photo: © Irene Dowdy

Their Excellencies the Governor-General Major General Michael Jeffery and Mrs Marlena Jeffery and table guests at Parliament House

Award winners

Recipients of the Academy's awards for 2007 were presented with their medals and gave a presentation on their research.

Professor Peter Hall from the Department of Mathematics and Statistics at the University of Melbourne delivered the Matthew Flinders Lecture on the real-world applications for research in statistics and probability theory in areas such as genomics, sensing bioweapons and detecting covert communications.

Monash University's **Professor Jamie Rossjohn** received the Gottschalk Medal for his research into infection and immunity which has provided insights into how viruses evade our immune system.

Also from Monash University, **Professor Robin Hyndman** received the Moran Medal for his work in forecasting, particularly his new method for forecasting age-specific mortality curves and Australian cancer rates and survival.

The Australian National University's **Professor Ian McDougall** received the Jaeger Medal for his research in Earth sciences, particularly plate-tectonics, and the evolution of humans in East Africa.

Photo: © Irene Dowdy

Robin Hyndman and Jean Moran

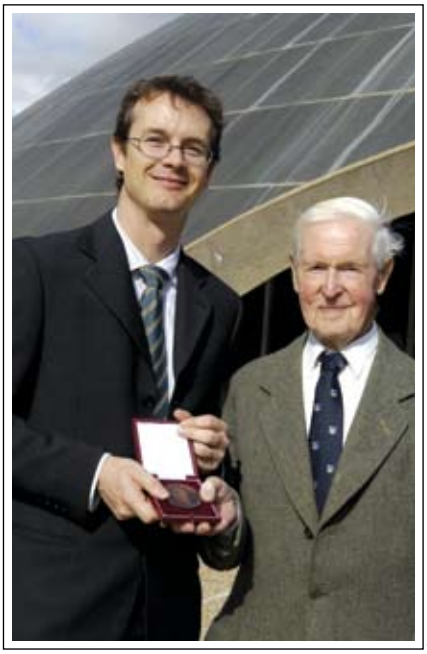


Photo: © Irene Dowdy

Peter Dodds and Frank Fenner

Also from the Australian National University, **Professor Yuri Kivshar** received the Lyle Medal for his many theoretical predictions in nonlinear physics and optics that have been verified in the laboratory.

CSIRO Plant Industry's **Dr Peter Dodds** received the Fenner Medal for his research on the flax plant and flax rust that could lead to engineering new rust resistance genes, saving the agricultural industry millions of dollars.

Professor Hans Freeman received the Craig Medal for his pioneering work in crystallography which led to his laboratory being the first in the southern hemisphere to determine the crystal structure of a protein, plastocyanin – essential for photosynthesis.

Professor Eugene Seneta received the Hannan Medal for his research in probability and statistics, and for developing the algorithm for scaling NSW Higher School Certificate marks and determining the Tertiary Entrance Rank.

(*continued on page 4*)

(*continued from page 3*)

Professor Ben Eggleton received the Pawsey Medal for his research in optical device physics and photonics, which is crucial to the development of the next generation of communication technologies.

For more information on the award winners see:
www.science.org.au/awards/2007awards.htm

New Fellows

Newly elected Fellows also gave a short talk about their research the day before being formally admitted to the Academy (see pages 6–7 for more on the new Fellows). The New Fellows Seminar and Peter Hall's lecture are available on DVD. For more information contact Sharon Abrahams on 02 6201 9415 or **sharon.abrahams@science.org.au**

Teachers

Each year the Academy makes available an award for one science teacher from each state and territory to attend *Science at the Shine Dome*. The teachers who win the Awards are very appreciative of the opportunity to meet the Academy Fellows and early-career researchers and to hear about the latest developments in many different areas of science.

This year's education workshop provided an opportunity for the teachers to experience an interactive workshop at the National Zoo and Aquarium in Canberra. Aligning with the symposium topic on *Development and evolution of higher cognition in animals*, the group were able to see the animal enrichment activities and programs undertaken at the zoo to meet the needs of the animals for a stimulating environment.

Early-career researchers

The Academy welcomed over forty enthusiastic early-career researchers for *Science at the Shine Dome* this year. From a diverse range of disciplines, these scientists attended all the seminars as well as some specific career development workshops. Experienced science communicators Jenni Metcalf and Toss Gascoigne ran an interactive workshop about presentation of research. Professor Simon Gandevia FAA, Prince of Wales Medical Research Institute, challenged the researchers' thinking by pointing out the cognitive errors that humans make unconsciously. The program was highly appreciated by all participants, especially the chance to speak to Fellows of the Academy. Some feedback on their experience:

- 'The New Fellows Seminar had outstanding presentations. It was highly motivating to get a sample of some of the best scientific output across many fields, home grown here in Australia.'
- 'The workshops were valuable resources that I can apply to my everyday lab work and interactions.'
- 'The attendance at the seminars and interactions with other participants will be an inspiration for doing further scientific research.'

Photo: © Irene Dowdy

Ben Eggleton, John Pawsey and Yuri Kivshar

Photo: © Russell Gray

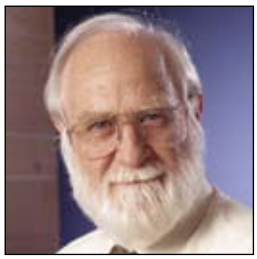
A New Caledonian crow using a tool to forage for food

Annual symposium

The final day of *Science at the Shine Dome* was set aside for the Academy's annual symposium. This year's symposium *Development and evolution of higher cognition in animals* brought together leading researchers from Australia, Italy and the United Kingdom. For more on the symposium see page 8.

New members of Council


Graham Farquhar


Ron Ekers


Paul Haddad


Andrew Holmes


Ross Crozier

Professor Graham Farquhar is the new Secretary, Biological Sciences. He is Distinguished Professor and Head of the Environmental Biology Group at the Research School of Biological Sciences at the Australian National University. He has made outstanding theoretical and experimental advances in the study of how plants use carbon, nitrogen and water and in the mathematical description of photosynthesis. He has found a promising technique for selecting drought tolerant varieties of crops.

Professor Ron Ekers is a new member in the physical sciences. He is currently Australian Research Council (ARC) Federation Fellow at the CSIRO Australia Telescope National Facility, Adjunct Professor at the Australian National University and immediate past President of the International Astronomical Union. He has an outstanding international reputation in the field of radio astronomy. His research interests include extragalactic astronomy, especially cosmology, galactic nuclei, radio astronomy techniques and image formation theory.

Professor Paul Haddad is a member in the physical sciences. He is an ARC Federation Fellow and Director of the Australian Centre for Research on Separation Science at the School of Chemistry at the University of Tasmania. He has a distinguished career in the development and application of methods for the separation of inorganic ions. His work includes the application of separation techniques to foods, pharmaceuticals and trace metals. He was the first person to derive reliable mathematical models to describe the separation of ions in a variety of ion exchange and electrophoretic systems.

Professor Andrew Holmes is a member in the physical sciences. He is an ARC Federation Fellow and VESKI Inaugural Fellow at the Bio 21 Institute, University of Melbourne. He is an expert in synthetic organic chemistry and electro-active polymers whose shape is modified when an electric field is applied. His work led to the discovery of the first example of light-emitting polymers and he is distinguished for contributions to the synthesis of biologically-important natural products and pioneering work relating to the development of flat panel colour displays, photovoltaic cells for solar energy production, and field-effect transistors.

Professor Ross Crozier is a member in the biological sciences. He is an ARC Professorial Fellow at the School of Tropical Biology at James Cook University in Townsville. He is a broadly-based evolutionary biologist who has made major contributions to sociobiology, phylogeny of birds and insects and to understanding the evolution of social behaviour. He developed the first quantitative genetic models for kin recognition and is a world leader in studies of the variation in numbers of mates among social insects.

New Corresponding Members

Professor Elizabeth Blackburn, University of California, San Francisco, and Professor Michael Powell, University of Cambridge, join a distinguished group of international scientists who have been elected Corresponding Members of the Academy. Corresponding Members are eminent scientists residing overseas who have developed links with scientific institutes in Australia and maintain strong ties with Australian scientists.

Professor Elizabeth Blackburn is Morris Herzstein Professor of Biology and Physiology in the Department of Biochemistry and Biophysics at the University of California, San Francisco. She has received many awards and accolades for her discoveries of the roles of telomere sequences at the end of chromosomes, and of telomerase: research that has transformed our understanding of how cells age and die. In recognition of her outstanding contribution to science, Elizabeth received the 2006 Albert Lasker Award for Basic Medical Research, shared with colleagues Carol Greider and Jack Szostak. She received the 2006 Gruber Genetics Prize for her research and promotion of science.

Professor Michael Powell is one of the principal figures shaping the computational revolution that was among the most significant scientific developments in the second half of the twentieth century. Michael's research has produced new algorithms, convergence theory, numerical implementations, and enlightening examples that have advanced every field of continuous optimisation. He has received numerous awards for his distinguished contributions, including the Dantzig Prize of the Mathematical Programming Society and the Senior Whitehead Prize from the London Mathematical Society.


David Cooper


Ian Dawes


John Finnigan


Min Gu


Richard Harvey


David Hill

New Fellows

Sixteen of Australia's leading scientists were honoured on 22 March by election to the Academy. Election recognises a career that has significantly advanced, and continues to advance, the world's scientific knowledge.

Professor David Cooper

Director, National Centre in HIV Epidemiology and Clinical Research, University of New South Wales, Sydney

David Cooper is one of the most influential clinical scientists worldwide in the field of HIV AIDS. He is a key investigator of the efficacy of highly active antiretroviral therapy and has discovered its metabolic toxicities. He plays a leading role in the design, conduct and coordination of international clinical trials, particularly in developing countries.

Professor Ian Dawes

Professor of Genetics, School of Biotechnology and Biomolecular Sciences, University of New South Wales, Sydney

Ian Dawes is a prominent member of the international yeast molecular genetics community. He has made outstanding contributions to yeast research in the fields of development, responses to oxidative stress and one-carbon metabolism. He is a pioneer in Australia in applying whole genome analysis to his research.

Dr John Finnigan

Director, CSIRO Centre for Complex Systems Science, Canberra

John Finnigan is a recognised world leader in the field of atmospheric turbulence over complex and vegetated surfaces. His research is important for the understanding of exchanges between the Earth's surface and the atmosphere: fundamental research for diverse meteorological and air pollution applications.

Professor Min Gu

Professor of Optoelectronics, Faculty of Engineering and Industrial Sciences, Swinburne University of Technology, Melbourne

Min Gu has pioneered ground-breaking three-dimensional optical imaging theory, enabling the development of modern 3D multiphoton optical microscopy. This has led to exciting innovations in 3D nanophotonics and biophotonics, such as his multiphoton optical endoscope that has established a foundation for in vivo study of cancer origins.

Professor Richard Harvey

Deputy Director, Victor Chang Cardiac Research Institute, Sydney

Richard Harvey is a leader in the study of mammalian heart development. His work with homeodomain genes shows that vertebrate and invertebrate hearts are formed by a common molecular mechanism. He was the first to explore the complex genetic basis of common congenital heart disease, inspiring discoveries in the inheritance of congenital heart disease and the biology of development and evolution.

Professor David Hill

ARC Federation Fellow and Professor, Research School of Information Sciences and Engineering, Australian National University, Canberra

David Hill is a highly respected and widely acknowledged world leader in the area of dynamic systems stability theory. The collapse of the Swedish power system in the early 1980s inspired his research in dissipative systems and its application to large-scale power networks. In this field his work is recognised as providing the complete theoretical foundation for voltage stability analysis.


John Hopwood


Ian Hume


David James


Peter Lay


Douglas MacFarlane

Professor John Hopwood

Head, Lysosomal Diseases Research Institute, Women's and Children's Hospital, Adelaide

John Hopwood is a world authority in the field of biochemical genetics, in particular hereditary metabolic disorders. He is recognised for his contributions to both the early diagnosis of lysosomal storage diseases and their treatment by gene transfer and enzyme replacement therapies.

Professor Ian Hume

Emeritus Professor, School of Biological Sciences, University of Sydney

Ian Hume is a world-wide authority in the field of comparative digestive physiology: his unique research combining an ecophysiological approach with basic digestive physiology. He has made original and important insights in regard to food utilisation by herbivorous mammals in general and marsupials in particular, thus forming the framework for conservation of several endangered marsupial species.

Professor David James

Director, Diabetes and Obesity Research Program, Garvan Institute of Medical Research, Sydney

David James is an international leader in cell biology research and has made original and influential contributions to the understanding of insulin action and diabetes. He discovered the insulin regulatable glucose transporter (GLUT4) and identified the key steps in the insulin regulation of glucose transport: now major therapeutic targets in diabetes.

Professor Peter Lay

Professor of Inorganic Chemistry, School of Chemistry, University of Sydney

Peter Lay is a chemist with an outstanding international reputation over a broad spectrum of fields, including bioinorganic chemistry and synchrotron research. His research addresses key issues in medical diagnostics and therapy, including metal-based anti-inflammatory and anti-cancer drugs, the toxicity and efficacy of chromium carcinogens and anti-diabetic treatments.

Professor Douglas MacFarlane

Professor of Chemistry, School of Chemistry, Monash University

Douglas MacFarlane has made exceptional contributions to the field of materials chemistry, including the preparation and physical properties of new ionic materials. His research led to the first identification of fast-ion conduction in plastic crystalline materials, and to a paradigm shift in the understanding of the role of vitrification in cryobiology.

Dr Rana Munns

Chief Research Scientist, CSIRO Plant Industry, Canberra

Rana Munns is recognised worldwide for her research on crop plants' adaptation to drought and salinity. She was the first to elucidate the commonalities and distinctions between adaptations to drought and salinity, devising highly effective techniques for selecting salinity tolerant plants. She has discovered genes in wheat that control the uptake of salt and so confer salt tolerance.

Professor Stephen Simpson

ARC Federation Fellow and Professor, School of Biological Sciences, University of Sydney

Stephen Simpson has pioneered major developments at the interface of nutritional physiology, ecology and behaviour. His discovery of the mechanisms that induce swarming in locusts has immense practical and conceptual benefits. His research into state-space models of nutrition is now being applied in a wide variety of contexts, including the search for dietary solutions for human obesity.

Professor Scott Sloan

ARC Federation Fellow and Professor of Civil Engineering, Department of Civil, Surveying and Environmental Engineering, University of Newcastle

Scott Sloan is a world leader in the field of computational geomechanics. He has developed techniques and applied them to engineering practice with great effect, being for instance the key architect of new numerical methods that enable engineers to predict the maximum load capacity of geostructures such as tunnels, dams, highways and foundations.

Professor Gordon Wallace

Director, Intelligent Polymer Research Institute, University of Wollongong

Gordon Wallace has built a world-wide reputation in the rapidly growing field of conducting polymers and carbon nanotubes. His innovative research has led to the utilisation of these new materials in many areas including new biosensing technologies; artificial muscles; polymer catalysts; corrosion protection; photovoltaic devices; and electronic textiles.

Professor Alan Welsh

Professor, Centre for Mathematics and its Applications, Australian National University, Canberra

Alan Welsh is a world renowned statistician. He uses theoretical and applied research to solve diverse and often intractable problems, including his seminal work on robust inference in linear regression, which provides an ingenious solution to a problem that has baffled experienced workers in the field.


Rana Munns


Stephen Simpson


Scott Sloan


Gordon Wallace


Alan Welsh

Annual symposium on higher cognition in animals

Most conceptions of 'artificial selection' wrongly and anthropocentrically presume that humans are choosing agents, but other species are not. The annual symposium on *Development and evolution of higher cognition in animals* clearly demonstrated to an audience of over 190 participants that other animals make selections too.

Professor Sir Patrick Bateson FRS, Professor of Ethology at the University of Cambridge in the UK, presented the Royal Society's Rutherford Memorial Lecture based on his deep interest in the ethics of using animals in research as well as his internationally known work on welfare aspects such as hunting red deer with hounds in England. He focused on how the adaptability of an animal can drive the evolution of behaviour and using examples from birds, rodents, chimps and invertebrates, he suggested that we can see:
'the product of a process which starts out being learned and then over the course of time, over the course of evolution, becomes partially or wholly made spontaneous. And so the thought is that we might have modules, which themselves can be changed, of course, as the result of experience, which actually predispose us to solve certain kinds of problems more easily than would otherwise be the case…in order to understand these processes…we need to know about development.'

All of the speakers at the symposium showed how animals may be much more consciously aware than first thought. For example, Professor Mandyam Srinivasan FAA from the University of Queensland outlined how honeybees use prior knowledge as they learn to detect poorly visible or camouflaged objects and how they are capable of associative recall triggered by familiar scents; Professor Giorgio Vallortigara from the University of Trieste in Italy showcased predispositions and core knowledge in chickens; and Professor Nicola Clayton from the University of Cambridge detailed how western scrub jays anticipate future needs and display extraordinary memory. The extent of some complexities was indicated by Professor Gisela Kaplan from the University of New England who showed how Australian magpie calls are learnt and cognitively complex and Professor Russell Gray from the University of Auckland who demonstrated how New Caledonian crows show remarkable tool manufacturing skills with fine honing and cumulative crafting in their design.

Photo: © Irene Dowdy

Left to right: Symposium speakers Giorgio Vallortigara, Nathan Emery, Ross Day, Lesley Rogers, Sir Patrick Bateson, Gisela Kaplan, Russell Gray, Nicola Clayton and Mandyam Srinivasan

The event showed how humans and animals share much in their dispositions, aims and even the criteria they use as products of processes of cognitive and cultural evolution. As Darwin wrote in 1859: '*A little dose…of judgement or reason often comes into play, even in animals very low in the scale of nature*.' The new research showcased at this event clearly builds on such early observations and has immediate ramifications for ethics and strategies for sensitively managing animal welfare.

The symposium outcomes are of considerable significance to our modern understanding of development and evolution. Professor Lesley Rogers FAA, Professor of Neuroscience and Animal Behaviour at the University of New England and convenor of the symposium concluded:
'these are issues that we have to grapple with very strongly in the years ahead, because our whole way of looking at animals and the way we treat them, both in research and agriculture and so on, will be vastly influenced by the new research that we are finding and hearing about'.

Proceedings will be available online at: **www.science.org.au/sats2007/symposium.htm**

Five Federation Fellowships

Five Fellows of the Academy have been awarded Federation Fellowships for projects on communication technologies, physical chemistry, theoretical and condensed matter physics and mathematics. The recipients are:

Professor Yuri Kivshar, Australian National University, to work on all-optical technologies, nanophotonics and metamaterials.

Professor Douglas MacFarlane, Monash University, to work on biocompatible ionic liquids.

Professor Robert Clark, University of New South Wales, to work on coherent transport of spin qubits in an engineered-atom silicon quantum computer.

Professor Gerard Milburn, University of Queensland, in the area of quantum nanoscience.

Professor Cheryl Praeger AM, University of Western Australia, to work on combinatorics, geometry and computation.

The Fellowships are granted to talented researchers working on a range of fundamental and applied projects with the potential to have a significant impact on our future economic, social, cultural and environmental wellbeing.

For more information see the Australian Research Council's announcement of the 2007 Federation Fellowships at: **www.dest.gov.au/Ministers/Media/Bishop/2007/05/B001220507.asp**

International news

US summer program in Australia

The Academy and the Unites States (US) National Science Foundation conduct a joint program that enables twenty US graduate students in science and engineering to visit Australia between June and August each year for a period of eight weeks during the American Summer. The purpose of the visit is to conduct research in laboratories and to initiate personal relationships with Australian counterparts.

The host research institutions such as universities, CSIRO and museums, provide the students with office accommodation, access to laboratory, library and computing facilities, as well as technical assistance and the time and expertise of the host researcher.

For the fourth year, the Academy organised a series of lectures and site visits as part of an orientation session in Canberra 13–15 June. Professor Jenny Graves, Foreign Secretary, welcomed the students to the Academy during the orientation session.

This activity is funded by the Department of Education, Science and Training's International Science Linkages Programme.

US-Australia comparative genomics workshop

The Academy and the US National Academy of Sciences organised a workshop on comparative genomics, at the Beckman Conference Center at the University of California, Irvine, 23–25 May 2007. Thirty five researchers from both countries gave presentations in areas relating to technologies for sequencing and assembly, using comparative genome analysis, chromosome and genome evolution, among others.

The workshop is expected to enhance Australia's involvement in several US-led mammal genome sequencing projects, and establish new international collaborations that will facilitate the best use of newly generated genomic data.

The convenors of the workshop were Professor Jenny Graves, Research Director at the Australian Research Council Centre for Kangaroo Genomics, and Professor James Womack, of the Center for Animal Biotechnology and Genomics at Texas A&M University's College of Veterinary Medicine.

This event was funded by the Department of Education, Science and Training's International Science Linkages Programme.

Visit to Korea

On 31 May Professor Jenny Graves met with Professor Hyun Ku Rhee, President of the Korean Academy of Science and Technology (KAST) at the KAST headquarters in Bundang. Professor Rhee commenced his term of office as President of KAST earlier in 2007 and Professor Graves took the opportunity to discuss ways in which both countries could strengthen the bilateral research collaboration.

On the same day, the Foreign Secretary was also hosted by the Korea Science and Engineering Foundation (KOSEF) in the city of Taejon. Professor Graves met with Mr Byung Whan Ho, Director, Division of International Cooperation, and discussed joint ongoing and new programs between the Academy and KOSEF. She also visited a number of research organisations in Taejon.

Professor Graves took this opportunity to congratulate KOSEF on the occasion of its 30th anniversary in 2007. Since its establishment KOSEF has made important contributions towards the promotion of science and technology activities in Korea.

InterAcademy Panel on international issues

The InterAcademy Panel (IAP) recently established a number of committees in the areas of fundraising and finance, evaluation, programs and strategic planning, publications and public relations, and membership. The President, Professor Kurt Lambeck, is the Chair of the IAP Publications and Public Relations Committee. Other members of this Committee are the Chinese Academy of Sciences, the Union of German Academies of Sciences and Humanities, the Académie des Sciences et Techniques du Sénégal and the Uganda National Academy of Science. This group of Academies has recently put together terms of reference for the Committee.

Adam J Berry Memorial Fund

Eva Szarek

Eva Szarek, a PhD student from the University of Adelaide, is this year's successful candidate for the Adam J Berry Memorial Award. The award assists an Australian researcher to travel or work in the USA at one of the institutes of the National Institutes of Health (NIH) each year. The fund is co-managed by the Academy and the Foundation for the US National Institutes of Health.

The award will allow Eva to travel to the NIH Laboratory of Mammalian Genes and Development, to conduct research related to the understanding of genes that regulate mammalian development, as well as their malfunction in human genetic disorders.

Information about the Adam J Berry Memorial Fund can be obtained by contacting Nancy Pritchard on 02 6201 9411 or **nancy.pritchard@science.org.au**

Women in science

Applications are now open for the inaugural L'Oréal Australia *For Women in Science* fellowships. The fellowships recognise scientific excellence by early-career women in the life and material sciences, mathematics or engineering, who have completed their PhD or equivalent in the last five years. Three fellowships will be awarded, each for $20,000. The closing date is 29 June 2007.

Application forms are available at: www.scienceinpublic.com/l'oreal.htm

News from National Committees

The biennial meeting of Chairs of all **National Committees and Task Forces** was held at the Shine Dome on 22 March. An informal survey of Chairs regarding national and international issues of import to those committees identified 'erosion of the disciplines' and 'concern for careers of early-career researchers' as the predominant issues in 2007. Breakout groups discussed the questions 'Is there life after the post-doctoral fellowship?' and 'Saving the disciplines from erosion by vocation: the Bologna solution'. A report of the meeting can be viewed at: **www.science.org.au/natcoms/ncmeeting220307** and Academy media releases on the outcomes can be viewed at: **www.science.org.au/media/28march07** and **www.science.org.au/media/27march07**

Members of the National Committee for Space Science

ICSU Anniversary

Two young scientists were sponsored by the Academy to attend 'Global scientific challenges: Perspectives from young scientists', a conference to celebrate the 75th anniversary of the International Council of Scientific Unions (ICSU), held in Lindau, Germany, 4–6 April 2007. Dr Andrew Hill from the Department of Biochemistry and Molecular Biology at the University of Melbourne and Dr Catherine Suter from the Victor Chang Cardiac Research Institute in Sydney were chosen from a field of high quality candidates to attend the conference.

Chemistry

Dr Deanna D'Alessandro, from James Cook University, Queensland, has won a 2007 International Union of Pure and Applied Chemistry (IUPAC) Prize for Young Chemists for the best PhD thesis in the chemical sciences. Dr D'Alessandro was nominated by the Committee and the Royal Australian Chemical Institute, and will be sponsored by IUPAC to attend the General Assembly in Turin in August.

Medicine and Biomedical Sciences

A joint meeting of the Committees was held on 7 March at the Shine Dome. The committees met separately in the morning, then jointly in the afternoon. Professor Warwick Anderson, Chief Executive Officer of the National Health and Medical Research Council, was the invited lunch guest. The National Committee for Medicine discussed medical research funding, stem cell legislation, and research ethics issues. The National Committee for Biomedical Sciences discussed a national visiting postdoctoral researcher scheme, codes of ethics, and a proposal for a national forum on education in biomedical sciences. The joint meeting covered national funding issues facing medical research, science workforce issues and career prospects for researchers.

Earth System Science

The Committee met at Ian Potter House on 24 April. Topics covered include the Terrestrial Ecosystem Research Network, RFCD Codes, a strategic plan for Earth System Science, future workshops on resilience and vegetation dynamics and climate change, the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report, and a subcommittee to advise on the effect of global warming on rates of evaporation during droughts.

Space Science

The drafting of the Decadal Plan for Space Science was a major focus of two days of meetings of the Committee in Canberra on 14 and 15 March. Day one was a National Committee meeting, and the Space Weather Statement and Plan and Research Fields, Courses and Disciplines (RFCD) Codes were also discussed. In addition, members gave updates on activities in astrobiology, planetary science, remote sensing, space physics and space technology. The second day was a writing day for the Decadal Plan.

A website for the plan can be viewed at: **www.physics.usyd.edu.au/~ncss**

Crystallography

The Committee met at the Society for Crystallographers in Australia and New Zealand conference in the Hunter Valley on 10 April. The agenda included issues with the OPAL replacement research reactor and the Australian Synchrotron, and bidding to host the 2014 International Union of Crystallography meeting in Australia.

Nutrition

The Committee met at the University of Sydney on 20 April. Accreditation of nutritionists, a nutrition leadership program, and emerging and current issues such as bottled water and fluoride, vitamin D deficiencies, salt and iodine, and diabetes and obesity were discussed.

News from National Committees

History and Philosophy of Science

The inaugural National Museum of Australia student essay prize in Australian Environmental History has been awarded to Coral Dow for her essay: 'A "sportsman's paradise": The effects of hunting on the avifauna of the Gippsland Lakes'. Coral completed her PhD studies at the Centre for Gippsland Studies, Monash University (Gippsland). An award ceremony took place at the Shine Dome on 26 April. The Australian Academy of Science, through its National Committee for History and Philosophy of Science, joined forces with the National Museum of Australia to establish the essay prize, and The National Museum of Australia Student Prize for the History of Australian Science. The winner receives a certificate and $2500, and winning entries are considered for publication in the National Museum of Australia's new journal, *reCollections*.

Photo: Lannon Harley © NMA 2007

Director of the National Museum of Australia, Craddock Morton, and Kurt Lambeck with the winner of the student essay prize, Coral Dow

OBITUARY

Chris Christiansen

Wilbur Norman ('Chris') Christiansen was born in Melbourne on 9 August 1913 and died on 26 April 2007. He was educated at the University of Melbourne (BSc 1934, MSc 1935, DSc 1953). After postgraduate work as a physicist at the Commonwealth X-ray and Radium Laboratory attached to the Physics Department at the University of Melbourne he moved to Sydney in 1937 to work in the research laboratories of AWA (Amalgamated Wireless of Australia), which was half-owned by the Australian Government. There he produced a direct-reading field intensity meter which was used to measure the attenuation of long radio waves between Canberra and the coast as a preliminary to building a long-wave transmitter for the Navy. Later, during the war, he investigated the single-frequency short-wavelength Beam Wireless Service between Australia and England, designing a closely spaced array of rhombic antennas.

In 1948 Chris moved to the Radiophysics Division of CSIRO as a Senior Research Scientist, later being promoted to Senior Principal Research Scientist. During his 12 years there he studied the origin of the slowly-varying component of the sun's radio emission and invented new radio telescopes of resolving power much higher than any in existence. These included the first 'grating telescope', the first use of earthly rotation synthesis to produce a map of a celestial object, and the first production of daily maps of the radio emitting surface of the sun by means of a grating-cross antenna. He also produced the first evidence of the spiral structure of our galaxy.

In 1960 Chris became dissatisfied with the direction in which the Division was heading and moved to the University of Sydney as Professor and Head of the Department of Electrical Engineering, where he undertook design work for radiotelescopes in the Netherlands, China and France. He also designed and constructed a large synthesis telescope in Australia, which he used for mapping a number of external galaxies and galactic sources. He retired in 1978 and the following year, now a Professor Emeritus of the University, he moved to Canberra as a Visiting Fellow of the Australian National University's Mount Stromlo and Siding Spring Observatories, where he stayed until 1985.

Chris was elected a Fellow of the Australian Academy of Science in 1959; in that year he also won the Syme Medal of the University of Melbourne. Other awards included the PN Russell Medal of the Institution of Engineers Australia in 1970, election as a Foreign Member of the Chinese Academy of Sciences in 1996, and a number of honorary degrees. He was offered a Companionship of the Order of Australia in 1976, but declined.

Chris was active in various overseas international organisations. In particular he was President of the International Union of Radio Science 1978–81, President Sortant 1981–84 and Honorary President (Life) 1984. He was also the Foreign Secretary of the Academy 1981–85.

Chris married Elsie Mary ('Elspeth') Hill, who predeceased him. They had three sons, two of whom, Timothy and Steven, survive him.

Primary Connections goes to Badu Island

By Robyn Bull
Primary Connections Project Officer

As part of the research consultation and collaboration for the development of the *Primary Connections Indigenous Perspective*, I recently accompanied the Questacon ScienceLines team on a visit to Badu Island. The visit gave me the opportunity to meet and talk to educators, students and community members from Badu, and the opportunity to experience Torres Strait Island culture and their idyllic, island environment. The scenic trip began with a two hour flight from Cairns to Horn Island before chartering a four-seater plane for the remainder of our journey to Badu.

The Badu Island Campus is part of the newly formed Tagai State College, an amalgamation of 17 Torres Strait Island schools. The dedication and expertise of the staff at Badu reflects their commitment to the Badu students and community. During my visit, I introduced staff to the *Primary Connections* curriculum resources and the professional learning program. The teachers indicated that the hands-on, investigative activities and the focus on literacy in Primary Connections would cater well for the needs of their students.

The proposals for the *Primary Connections Indigenous Perspective* were discussed and feedback was sought from teachers, teacher aides and parents. Several teacher aides from the school are training to become qualified teachers with the *Remote Area Teacher Education Program*. I visited the Program's centre and listened to insightful anecdotes and advice about teaching Torres Strait Island students. It was most rewarding to observe and work with the students in their classrooms. They told me that school is a 'great place' and that learning is 'very important'.

Students of Badu Island participate in 'Funtastic Friday' activities

Interesting island formations indicate the shallow nature of the Torres Strait. Wind generators on Thursday Island in the background are referred to as 'big breezes' by the Islanders

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Did you know that there are more than 200 trained *Primary Connections* Professional Learning Facilitators located throughout Australia? Facilitators work within each state to support schools that are interested in implementing the *Primary Connections* program.

Honours to Fellows

Professor Tom Healy, University of Melbourne, has been awarded Nature's Inaugural Lifetime Mentoring Award.

Professor Bob Graham, Victor Chang Cardiac Research Institute, has received the 2007 Heart Foundation Research Medal for Lifetime Contribution to Cardiovascular Research. The Medal is awarded annually to an individual who has had a lifetime of outstanding achievements in the field of cardiovascular research and who has served as a role model through service, research and teaching.

Professor John Ralston, University of South Australia, has been awarded the 2006 Premier's Science Excellence Award (South Australia), the Chemeca 2006 Medal for Outstanding Service and Contribution to Chemical Engineering and the inaugural prize for Most Outstanding Contribution to Mining in 2006 by *Australian Mining*.

Professor Min Gu, Swinburne University of Technology, has been elected to the Fellowship of the Australian Academy of Technological Sciences and Engineering.

Professor Noel Hush, University of Sydney, received the 2007 Welch Foundation Award in Chemistry for Lifetime Contributions to Theoretical Chemistry.

Two Academy Fellows and a Corresponding Member have recently been elected to the Royal Society. They are **Professor Samuel Berkovic AM**, **Professor David Boger** and **Professor Terence Tao**, respectively. The list of the Royal Society's new Fellows is available at: **www.royalsoc.ac.uk/page.asp?tip=1&id=6616**

Queen's birthday honours

Adjunct Professor Nicola Sasanelli AM, Scientific Attache of the Embassy of Italy, was appointed an Officer of the Order of Australia 'for service to Australia-Italy bilateral relations by developing and promoting research and scientific linkages'. Professor Sasanelli worked with the European Commission and the Australian Government to establish the Forum for European-Australian Science and Technology Co-operation.